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ABSTRACT

Noting the difficulty in translating constructivist theory into effective practice, this study examined how primary school teachers implemented constructivist education into their kindergarten through second-grade classrooms. Participating in the study were six teachers who had received master's degrees from a constructivist program and who had been rated by faculty as successful on five dimensions related to constructivist theory. Data were collected by means of classroom observations, interviews, and surveys. These were analyzed using the qualitative methods of developing constructs, writing analytic memos, defining conceptual schemes, and writing classroom vignettes. The findings revealed that three teachers used more traditional approaches and three used more constructivist approaches. All scored high on the constructivist teaching scale of the Teachers' Belief Survey. The traditional teachers scored just as high on the behaviorist scale, whereas the constructivist teachers scored significantly lower. Teaching processes varied between the two groups, although both groups respected children, motivated hands-on activities, and provided effective management. A focused analysis of the three constructivist teachers and their classrooms supports the elements of constructivist classrooms identified by DeVries and others (1998) as well as three broader characteristics: the importance of children, interactions among classroom participants, and engagement in academic activity. A vignette of one classroom illustrates important constructs to consider in constructivist education, including respectful relationships, real conversations and purposeful talking, intellectual engagement, and shared ownership and responsibility in behavior, learning, and the classroom environment. (Contains 31 references.) (KB)

Constructivist Pedagogy in Primary Classrooms

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Constructivist Pedagogy in Primary Classrooms

As primary schools and classrooms become increasingly complex, educators are searching for ways to meet their students' varied needs. Traditional models and structures for teaching and learning are not always working well for teachers or children. Constructivist theory offers an alternative to traditional transmission models. However, translating constructivist theory into effective practice is difficult because of the nature of the theory, the diversity and complexity of classrooms, and the fact that constructivist teaching is not a "monolithic, agreed upon concept" (Richardson, 1997, p.3). This is true for classroom teachers and teacher educators.

From a teacher educator perspective, our graduate programs in early childhood education at Georgia State University are guided by principles of constructivist theory (Fosnot, 1996; Lambert, Walker, Zimmerman, Cooper, Lambert, Gardner & Ford Slack, 1995; Putnam & Borko, 2000; Richardson, 1997) suggesting that knowledge resides in the learner and that learning is a social activity enhanced by reflection, metacognition and inquiry. We model constructivist practice in the belief that teachers are better able to understand and implement constructivist principles having experienced them in their work. In this practice we attempt to be explicit about constructivist practice in our program and in elementary classrooms. As we examine and modify our constructivist pedagogy, one key question for teachers and ourselves emerges: What does a classroom based on constructivist pedagogy look like in early childhood (K-2)? What distinguishes a constructivist learning environment and how can a teacher design constructivist instruction?

Literature informing our work

Over many years, educators have attempted to define constructivist education and provide principles of constructivist pedagogy and reflections on constructivist classroom practice. Selley (1999) defines constructivist pedagogy as an "ideology that places emphasis on the meaning and significance of what the child learns, and the child's active participation in constructing this meaning" (p.6). Recent attempts by educators to articulate principles of constructivist pedagogy (Brooks & Brooks, 1993; DeVries & Zan, 1994; Lambert, Walker, Cooper, Lambert, Gardner, & Slack, 1995; Marlowe & Page, 1998; Selley, 1999; Teets and Starnes, 1996) provide frameworks to guide practitioners. Teachers writing about their practice (Oyler, 1996; Poduska, 1996; Seabrook, 1997; Stracchata, 1996) provide insightful descriptions of their classrooms and reflections on their practice. What is missing is research by teacher educators and classroom teachers to investigate systematically constructivist pedagogy. This study was designed to investigate constructivist pedagogy and learning environments in early childhood (K-2) classrooms.

Wilson (1996) defines constructivist learning environments as "a place where learners may work together and support each other as they use a variety of tools and information resources in the guided pursuit of learning goals and problem-solving activities" (p.5). He suggests analysis that focuses on the constituent parts or key components of typical learning environments. Marlowe and Page (1998) identify core components of constructivist classrooms. They include the language you use in the classroom and the classroom communication system, student and teacher roles, classroom management, the physical environment, student choice, how students

interact with content, and assessing student learning. They suggest a continuum of practice within each of these components. Winstichl (1999) suggests we view constructivist classrooms as a culture, "a set of beliefs, norms and practices that constitute the fabric of school life" (p.752). This culture, in turn, influences interactions, relationships and experiences. DeVries & Zan (1994) also provide an in-depth discussion of constructivist classrooms based on their research in kindergarten classrooms. They argue that implementing constructivist education involves more than activities, materials and classroom organization and suggest that a sociomoral atmosphere ("the network of interpersonal relations that make up a child's experience of school," p.22) supports and promotes children's development. They describe constructivist classrooms in terms of: a) the organization, including meeting children's needs, encouraging peer interaction and facilitating children taking responsibility; b) activities, including engaging children's interest, encouraging active experimentation, and fostering cooperation; and c) the teacher's roles and relationships with children, including facilitating children's constructions, fostering cooperation and interpersonal understanding, and promoting moral values. This framework provided a beginning point for our study.

Methodology

The goal of this research is a clearer understanding of constructivist pedagogy in the context of primary classrooms. The study was designed using qualitative methods in order to capture the complexities of teaching and classrooms. The classroom participants are six teachers who graduated from a constructivist Master's degree program (1 in 1996, 2 in 1997 and 3 in 1998). The faculty rated them as successful on five dimensions related to constructivist theory.

They were chosen to represent different grade levels (2 of each K, 1 and 2), diverse school systems, and varied years of experience (mean is 8.5 years). Two researchers participated in the study in a role described by Wolcot (1988) as privileged observers, "someone who is known and trusted and given easy access to information" (p.35).

Data collection included demographic data on the teachers, classroom observations, formal interviews and a survey of teachers' beliefs. Formal, full-day observations were made in each classroom, using an observation instrument based on the Constructivist Early Childhood Classroom Evaluation (DeVries, Edmiaston, Fitzgerald & Zan, 1998) that focuses the observation on the physical, social, linguistic, intellectual, curriculum, and technological environment of constructivist classrooms. Teachers were interviewed (audiotaped) after the observation to document their conceptions of constructivist theory and practice and clarify ideas based on the observations. Teachers also completed a Teacher Beliefs Survey (Wooley & Wooley, 1998) to identify teachers' beliefs about teaching related to constructivist and behaviorist paradigms of learning. To honor our ethical obligations to teachers who open their classrooms to us, we used pseudonyms throughout the paper.

In the process of organizing and structuring the data gathered from the observations, interviews and surveys, we made use of several analytic methods including developing constructs, writing analytic memos, and defining conceptual schemes. Member checking and peer debriefing were important in maintaining credibility. Writing vignettes (Ely, 1991) of the six classrooms proved helpful in viewing the commonalities among classrooms. This combination of strategies

allowed us to synthesize categories while keeping the richness of the classrooms. Based on the scores on the Teachers' Beliefs Survey and our observations in classrooms, we identified three of the six teachers who were distinctively more constructivist in their approach to teaching and learning. In a retrospective analysis of the data from these three teachers, we describe a constructivist classroom using traditional classrooms as a reference point. From an analysis of these descriptions, key elements of constructivist classrooms emerged. The strength of this study is what Rubin and Rubin (1995) describe as "conversational partnerships" (p.93) with individuals who feel comfortable talking to us openly and in depth. The potential limitation of this study is the lack of prolonged engagement.

Findings

We take pride in each of the teachers who participated in this study. All six of the teachers are considered effective although three use more traditional approaches and three use more constructivist approaches. Having data from distinctively different teachers and types of classrooms provided serendipitous possibilities for analysis. Having three teachers who were considered more traditional and three considered constructivist provided a benchmark for good teaching and a point of departure for viewing constructivist teaching.

Examining the results of the Teachers' Beliefs Survey (Wooley & Wooley, 1998) there was a significant difference between the three traditional teachers and the three constructivist teachers (see Table 1). While all scored high on the constructivist teaching scale, the three traditional teachers also scored equally high on the behaviorist scale and the constructivist teachers scored significantly lower on the behaviorist scale. What seems to be happening is that

traditional teachers espouse behaviorist and constructivist beliefs; constructivist teachers hold beliefs consistent only with constructivism.

All six participants were very good teachers; all six teachers shared characteristics, such as respect for children, motivating hands-on activities, and effective management. The point of departure for distinguishing constructivist teaching was not a value judgment on the teacher, but differences in the processes of teaching. In the more traditional classrooms the teachers managed the children's behavior more than did the children themselves and also relied more on reminders, rewards and praise. They also did much more of the talking; most of the dialogue in these classrooms was between teacher and student. In traditional classrooms, the teacher orchestrated most of the action, whether content, transitions, or schedule. The teacher maintained ownership of the classroom and most of the responsibility; the children's main tasks were listening, participating in activities, and cleaning up. The teacher made the curriculum decisions. The daily schedule had very distinct times for each content area, little ongoing, project work was evident, and centers were not a predominant component of the day. The children tended to move at the same pace on similar work.

All of the classrooms were good places for children, yet there were differences in where the teachers fell on a traditional to constructivist continuum of teaching and learning. Our goal was not to determine which end of the continuum was "best," but to gather data in order to have an accurate description of the constructivist classroom. We wanted to paint a picture that would be helpful to teachers who are working on being more constructivist.

Further analysis of the six classrooms indicated 24 key elements of constructivist classrooms. They are categorized in five areas (DeVries, et al., 1998): physical, social, linguistic, intellectual and curriculum (Table 2). A focused analysis of the three constructivist teachers and their classroom supports these elements and indicates three broader characteristics: the importance of children, interactions among classroom participants and engagement in academic activity.

The importance of children. The importance of children is evident in our observations of the physical, social and intellectual environment of the constructivist classrooms. The children refer to the classroom as "our classroom". It is arranged, with children's help, to meet their needs and establish shared purposes for the areas. Their work (both individual and collective) is prominent and often used as a reference. The language of the classroom is respectful of children's ideas and feelings. Children's talk is valued and opportunities to collaborate are encouraged. Sharing responsibility with children is another example of the important role the child. Children have opportunities for self-direction and participate in decisions regarding curriculum and management.

In our interviews with each teacher, they express their views of the importance of children and provide examples of how this characteristic lives in their classrooms. Eva begins our conversation by saying "I am not teaching specific skills: I am teaching children". She talks about her first graders as "key players" in all aspects of their classroom management. "They begin the year by participating in constructing the physical environment, creating their calendar, and generating class rules in the form of promises for working with each other". For example, "at the

beginning of the year, we talk about what makes a good teacher, what makes a good student, and then what we need to make our classroom work for us". She believes the class promises guide the children's choices of behavior and academic work.

Eva also believes children are capable of creating their own knowledge. She states, "integrated, flexible, and open-ended projects and centers can be planned and implemented with the children's help and based on their interests. She describes a study of arctic areas that began with polar animals and led to creating a toy museum after several children wrote about Santa's workshop at the North Pole. Centers ranged from globe work to measurement of the temperatures of ice. She finds center work is one way to meet children's individual needs and interests while encouraging collaboration.

Interactions among participants. Our observations indicate that interactions among classroom participants, teacher-child and child-child, are another characteristic of constructivist classrooms. Teachers and children have created a classroom community based on norms or "class promises" for interactions that they negotiate together. These norms encourage communication including sharing ideas, opinions and questions, and working out conflicts. Listening with genuine interest is evident in formal and informal interactions. Structures such as class meetings and portfolio conferences provide formal opportunities for interaction. Peer interactions continue throughout the day with more informal activities, such as centers, project work and "game day". In all three classes, music was observed to be a powerful form of communication and parents were included in the classroom community.

In interviews with the teachers, they share their beliefs about the potential of interactions and how they encourage those conversations. Deb, a second grade teacher, believes that if learning is social, then sharing among children is critical and her role is to facilitate those opportunities. She accomplishes this by using tables rather than desks, setting up class meetings, and planning cooperative activities. In these settings, children are encouraged to share ideas, solve problems, and make decisions. Daryl, a first grade teacher, believes the children's work in centers provides meaningful interactions. For example, "today I had a poinsettia with a magnifying glass available, and a paraprofessional discussed the children's observations with them. As the children wrote and illustrated their ideas, she added vocabulary and suggested they read The Legend of the Poinsettia. This is a good example of the connection between interactions and engagement in academic activities.

Engagement in academic activities. Our observations indicate that teachers and children are actively engaged in academic activities in a constructivist classroom, with curriculum playing a central role. The curriculum builds on children's interests and experiences, and whenever possible, these include shared experiences such as field trips and playground experiences. Curriculum is negotiated collaboratively within the confines of county curriculum requirements. Children are allowed choices about how and when to engage in their work. Teachers' roles include communicating objectives, providing opportunities and authentic resources, encouraging thinking and helping children make connections. Children participate in planning and managing their learning and behavior within given school and county requirements. Teachers and children share Rolels and ownership of the learning. Young children seem to understand the importance of their

work.

In interviews, teachers described many strategies to engage children in academic work. In Daryl's first grade class, children initiated a study of Spanish-speaking countries. In Sadie's kindergarten class, children researched the habitats of the birds they chose to investigate. In Eva's first grade class, children planned and constructed their toy museum classifying the toys according to how they move. In Carly's second grade classroom, children plan their work using a Know – Want to know more – How to learn it - Learned (KWHL) chart that serves as a planning document and a record of their ideas and accomplishments.

While we described each of these characteristics separately, defining concepts (concepts that help define a category) links them. For example, in each category, teacher guidance, child talk and children's roles in decision making are defining concepts. While we separated these ideas for discussion and emphasis, they are intertwined, as you will read in the vignette.

A vignette is an "inferred soliloquy" (Ely, 1991, p.153) based on the analysis of observations and interviews. It represents ideas that are considered central to the findings. The intention is to present, in composite, the essence of our findings, while also maintaining "meaning, cohesion and color" (p.154). While vignettes are distilled from all data, the participants' words are preserved wherever possible.

A vignette of a constructivist classroom. Sadie is a kindergarten teacher in an affluent school in a large, fast growing system. There are 22 children in her class, 8 represent minorities. Today is a rainy Friday in early December. I arrive early and am greeted by a giant pink flamingo on the classroom door.

Sadie describes constructivist teaching and learning as providing opportunities for children to take as much responsibility for learning as appropriate, and in the process, she learns more herself. She identifies her goal for the children as autonomy and she provides many opportunities for them to take initiative, make decisions, and follow through with work. She believes that the children are very capable. This is evidenced in the importance of children, the interactions and the engagement in academic activity.

A first look at the physical environment of the classroom indicates the importance of the children. The children design the space, furnishings, materials and their arrangement for usefulness and accessibility. The children helped create the classroom space at the beginning of the year. They created personal and community space. There is also a lived-in (what some would consider messy with an order that works) look indicating that the areas are frequented and the materials are well-loved, including Snuggles the Guinea Pig. You see commercial materials, such as books, paints, puzzles, games, and blocks. However, many of the materials are non-traditional. For example, materials such as bird nests, feathers, reference books and paper towel rolls used to create binoculars, are collected to support their current study of birds. Children's individual work and class work are displayed for easy reference. These include discussions recorded by class (such as topics of study for year) and children' representational work.

The responsibility given and taken by the children best exemplifies the social environment. Class rules called "promises"originated with the children early in the school year and are signed and posted for easy reference. Children handle all routines such as attendance, lunch count, cleaning, and "pack and stack." They are responsible for instructional time, for example, during

calendar time one child leads the others while Sadie moves to the back of the group in the role of a participant. Children also negotiate their work in a daily planning time. Class and individual projects add to their decision-making opportunities. The class schedule is flexible, with long blocks of uninterrupted time, allowing for spontaneity and interactions of the children. Opportunities to work together, such as project work and cooperative games, encourage peer interaction. Children are responsible for each other, from helping with projects to comforting a child during a sad moment. In Sadie's role, she encourages them to help each other with tasks and with problems to resolve. Conflicts are opportunities for children to practice their skills. When a child is upset, Sadie acknowledges that he/she is mad and that feelings are okay when communicated respectfully. There are loving and demanding moments. Sadie is always warm and respectful of the children. She is careful to explain "why and how" she does things. The passionate engagement of Sadie and her children came through in music. As she plays the guitar, every child sings full-voice, and from the heart, the songs they have come to know as a class.

Standing back and looking, you see an active but calm classroom. Sadie prefers a low noise level, but this does not exclude conversation. Communication is an integral component of this classroom. Communication is conversation-like rather than the questions-answer tradition. There are more peer interactions than teacher-child interactions. Sadie encourages peer interactions more by providing opportunities to work together than by her words. She believes teacher interactions should encourage and extend children's thinking. She sits with the children during work time and is genuinely engaged in conversation with them. Sadie encourages responsible behaviors (sitting while you are painting) and reminds children of ongoing work. She

encourages children to extend their thinking and attend to details. She often asks questions like "how can we figure that out?" and "how could you add to that?" From there, children take over. Peer interactions are task-oriented, purposeful and functional, for example, how to play a game or put together a pair of binoculars. Sharing personal experiences occurs more during lunch and recess together.

Sadie describes constructivist teaching as "challenging as well as nurturing the children." Because she believes in the children, she feels she pushes them academically; they push each other; and she and the children learn more. This is a productive, intellectually challenging classroom. Large group times are dedicated to curriculum planning, music and stories. Time for children to work in small groups encompasses most of the day. The curriculum during this observation is a child-initiated study of birds. It is one of four units of study chosen by the children. They will also engage in two topics required by the county. Content areas are integrated within this unit with a heavy emphasis on science, art, language and music. The long blocks of work-time allow the children to work deeply and finish projects. Today, many children are researching the distinguishing marking of various birds so that they could accurately paint their paper mache models. Others are constructing binoculars to use in the bird watching excursion they have planned. I observed several layers of content and different levels of engagement during work time.

Children's ideas are acknowledged, discussed and implemented each morning. They begin the day with a planning session, where they discuss their plans and reflect on their progress. Today, some children describe their plans to finish painting their birds, while others construct their

binoculars. Quiet time is dedicated to journal writing as morning work time ends. Most activities are self-directed. However, you do see traditional activities interspersed when small time segments need to be filled. For example, a "D is for duck" cut and paste activity is interjected during a twenty-minute lull before outside time. Assessment is ongoing and anecdotal, with checklists and portfolios to help. Errors are challenged respectfully. Sadie views them as opportunities for presenting children with another viewpoint. Sadie's goal is to involve the children more in assessment in the future.

We observed and listened to teachers and children talk about "their" work in real classrooms. Watching and listening to teachers and their children, then looking at them as a whole provides underlying commonalties. These findings suggest important constructs to consider in constructivist education:

- respectful relationships;
- real conversations and purposeful talking;
- intellectual engagement; and
- shared ownership and responsibility in behavior, learning and the classroom environment.

Interestingly, these constructs are also those that are reported in the literature on learning communities (Oyler, 1996; Peterson, 1992; Sergiovani, 1994).

Conclusions and significance

Each teacher had important ideas and perspectives. We observed the continuum of constructivist dimensions suggested by Marlowe and Page (1996). We observed what Kohn (1996) describes as "working with" classrooms and "doing to" classrooms. We confirmed Oldfather's findings (1992) relating to self-expression, honored voice, and sharing wonderful ideas. Our findings are consistent with Windstichl (1999) and DeVries and Edmiaston (1998) that

suggest research must look beyond discrete practices associated with constructivism (hands-on experience, performance assessments, cooperative learning) and examine the fundamental norms of classrooms, that is, the beliefs teachers hold of teaching and children, the kinds of discourse encouraged in the classroom, the way authority and decision making are controlled and what counts as learning.

These ideas help provide an image of what is possible in constructivist classrooms. We now have a clearer picture for teachers who want to use constructivist approaches in their classrooms. From our study, we can talk about constructivist classrooms, and yet cannot specify exactly what such a place looks and sounds like. Our findings present a conceptual framework as a beginning point to guide teachers' practice and add layers of dialogue about real classroom experiences" as suggested by Windstichl. (1999, p.752).

This framework also has the potential to inform research (Stork and Engel, 1999) on developing teacher evaluation instruments based on constructivist theory. "A critical responsibility we have in the change process is knowing how to "look at" our students' teaching during their field placements" (Dittmer, Fischetti, & Kyle, 1993). An observer in a constructivist classroom would note different norms, discourse, and a change in the role of the teacher. Rather than evaluating how efficiently the teacher disseminated the content knowledge, the observer might comment on how the teacher facilitates educative moments in the classroom where children are constructing an understanding of concepts. As teacher educators begin to identify guidelines or principles of constructivist practice, they can explore the application of these to assessment instruments for pre-service and in-service teachers.

The three constructs evolving from this study are consistent with the guidelines created by others seeking to evaluate constructivist teaching. The *importance of children* is evident in Stork and Engel's rubric under the following criterion: "teacher incorporates new directions for instruction in response to student variation and responses; opportunities are provided for a variety of child-initiated projects; children are provided a choice"(1999, pp23-27). *Interactions among classroom participants* are addressed by Kyle, et al. as guiding principles: "creating a classroom community, emphasizing cooperation; establishing classroom rules which stress student choice, responsibility, roles, and power; helping children value the unique individuality of each child in the classroom" (1993, p.41). The final construct, *being actively engaged in academic activities*, also resonates with Stork and Engel's criterion: "activities are presented so as not to predispose children to externally imposed goals; the teacher considers children's interests and experiences when designing learning situations; activities allow transfer of learning to new contexts" (1999, p.27). A dialogue among constructivist teacher educators is important as we continue to pursue inquiry into constructivist classrooms.

Our findings also have relevance for school reform and teacher education. Advocates for constructivist models of teacher education (Duckworth, 1997; Lambert, et. al., 1995; Palmer, 1998; Richardson, 1997; Rainer & Guyton, 1998) suggest these same ideas for teacher education programs. Those who work in school reform (Glickman, 1998; Sergiovani, 1994) make similar recommendations for teacher development and K-12 classrooms. Respectful relationships, purposeful communication, intellectual engagement, and shared ownership have relevance for all learning.

Table 1. Teachers Beliefs Survey

Teacher	Behaviorist management t = 48	Behaviorist teaching t = 48	Constructivist teaching t = 42	Constructivist parents t = 24
Diedre	28	28	28	14
Darlene*	22	17	34	20
Evelyn*	22	17	35	21
Carla	18.5	32	34	23
Karen	31	26	32	17
Sadie*	25	16	38	23

Note. *t* = the total number of points possible in each category.

Table 2. What's important in constructivist classrooms?

Physical environment

- Access and use of materials by children
- Children's and teachers ownership of environment
- intentional thought about materials and how they relate to learning
- logic or coherence to environment/materials
- loosely defined spaces that have alternative uses
- child centered transitions

Social environment

- children's responsibility for classroom, instruction, schedule, routines
- children have structured and spontaneous opportunities for decision making
- teachers are truly engaged with children during interactions
- self and community management
- explicit opportunities for acknowledging respect, caring, conflict, negative emotions

Linguistic environment

- informal conversations rather than question and answer
- purposeful talk that is related to work
- real questions and real interest in answers
- initiation of ideas from children
- encouragement of peer interactions

Intellectual

- project work develops layers of content knowledge and allows different levels of engagement and interaction
- challenges errors and acknowledges them as opportunities
- clear encouragement of self-assessment
- variety of groupings for instruction

Curriculum

- children encouraged to see connections in learning
- balance of activity growing out of children's experience
- large periods of work time
- variety and choice of instructional activities

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